Mission Bay

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STADIUM AND ARENA IN THE VICINITY OF MISSION BAY

INTRODUCTION

Since publication of the Mission Bay Draft EIR in August 1988, Mayor Art Agnos released an invitation for proposals for a stadium to be located on the block bounded by Second, Third and King Streets, and San Francisco Bay; and an indoor arena complex at Seventh and Townsend Streets. Neither of the facilities is included as a component in a development proposal for Mission Bay. However, the arena site is located within the current Mission Bay Project Area boundaries; if an arena is approved, those boundaries would be modified to exclude the arena site.

Three developers responded to the Mayor's request for proposals, which have undergone preliminary review. One of them, Spectacor Management Group, received initial authorization to pursue and negotiate with the City an economic and design program for the two facilities. At this time, no final design or operational program for the stadium/arena has been prescribed. Such details will be developed as negotiations continue in the next several months. Those negotiations would, among other issues, address a financial program, which would determine the feasibility of pursuing this project.

Because of the potential magnitude of activity posed by these two developments and their close proximity to the Mission Bay Project Area, additional environmental evaluation is required to supplement the cumulative impact analysis presented in the Mission Bay Draft EIR. This is necessary to ensure that implications of the two facilities as they may affect surrounding areas, and city or regional systems, have been adequately accounted for in the cumulative analyses. The focus of the analyses presented below therefore does not address specific design or program details of the stadium or arena; those types of issues will be subject to separate environmental review if a detailed program is ultimately defined.

To evaluate a scenario with adverse conditions that are reasonably likely to occur, the primary stadium/arena analyses assume the presence of the land use program described in EIR Alternative A in the Mission Bay Project Area. For purposes of the analysis, it has been assumed that the Mission Bay S/LI/RD land uses at Seventh and Townsend Street in Alternative A would be consolidated with other S/LI/RD uses elsewhere in the Project Area to allow the proposed arena to occupy that corner.

The stadium/arena facilities are assumed to be completed in 1995. In most cases when a time horizon is applicable, the analyses below evaluate cumulative impacts in year 2000, because there is an extensive body of information on cumulative impacts available for this timeframe. In a few instances where the stadium/arena would have identifiable impacts beyond 2000, they are discussed accordingly.

PROJECT DESCRIPTION

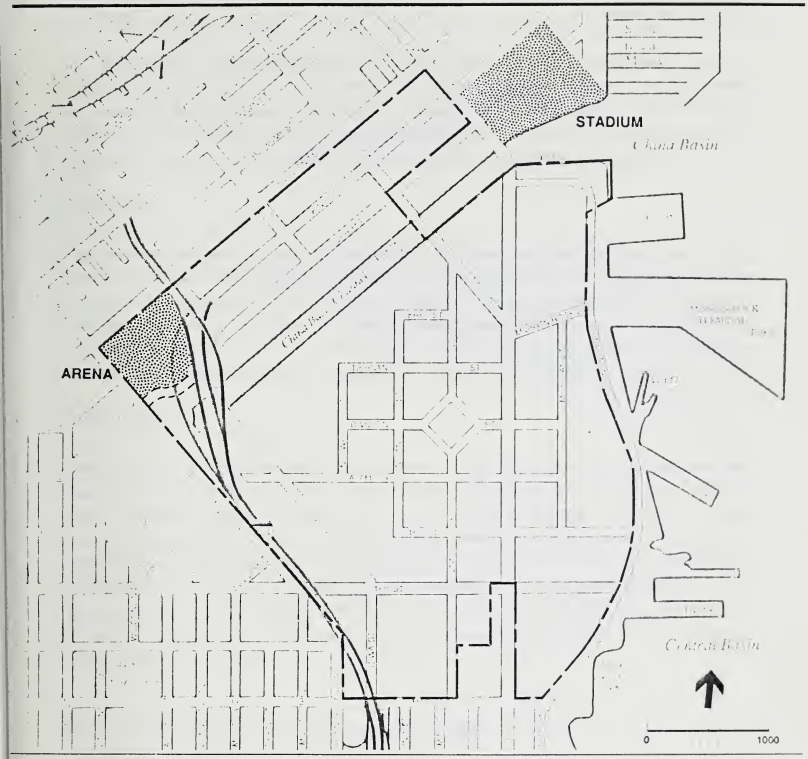
As stated earlier, few details about the stadium/arena design, operation or programming are known, as the proposal is still in its early stages of negotiation. However, general parameters are identified below for each of the facilities, which establish the bases for the impact analyses presented herein.

THE STADIUM

The stadium site is shown on Figure 1. The site is in multiple ownership by the Port of San Francisco, the City and County of San Francisco, and the California State Department of Transportation (Caltrans). The proposed baseball facility, with a seating capacity of 45,000, would likely occupy most of the site, with a building height ranging between 100 and 150 feet. In addition, it is assumed there would be on-site parking with a capacity of about 3000 vehicles.

Under major league standards, the general orientation of the field would locate the outfield closest to the bay (to the east), and the infield further inland (to the west). The line from the pitcher's mound to first base would be in an approximate north-to-south direction. The facility would be available for other events, such as concerts, as well as baseball. It would include outdoor lighting and sound systems, the characteristics of which have not yet been specified. It is assumed MUNI would provide Ballpark Express shuttle bus service for baseball games, similar to that currently provided to Candlestick Park, and that new direct or increased regional transit service for stadium/arena events would be provided by SamTrans, Golden Gate Transit and CalTrain.

In addition to review and approval required by the City, the stadium project would depend on purchase of property from Caltrans. The project also would be subject to approval by the Bay Conservation and Development Commission (BCDC) and the California State Lands Commission (SLC). BCDC has authority over lands that fall within 100 feet of the Bay shoreline. Any stadium design would be reviewed by BCDC for compliance with public access requirements set forth in its policy documents, the San Francisco Bay Plan, and the San Francisco Special Area Plan.



Mission Bay

FIGURE 1
LOCATION OF STADIUM AND ARENA

OURCE: Environmental Science Associates, Inc.

Pier 46B, located in the southern portion of the stadium site, is held in public trust by the Port of San Francisco. Disposition of Pier 46B for the construction of the stadium would be subject to review of the State Lands Commission to determine its compatibility with public trust restrictions. If the project does not meet those public trust requirements, the SLC would have the authority to transfer the public trust to other lands determined to be appropriate.

THE ARENA

The arena site is owned by Santa Fe Pacific Realty Corporation. The project proposed for this site would be an enclosed public arena with a seating capacity of 20,000. Its building envelope would likely range from 100 to 120 feet in height. It would be available for a variety of activities, including professional basketball or hockey league series or other sporting events, concerts, conventions, and other public events. It has been assumed the site would also contain a parking structure with an approximate capacity for 2000 vehicles.

EVENT TIMES

The two facilities would accommodate various types of events on weekdays and weekends, during the day and evening. Two analyses have been prepared. Scenario One evaluates future conditions assuming a sell-out crowd at the stadium during a weekday afternoon; Scenario Two evaluates impacts associated with a weeknight sellout crowd at the stadium, and a 50%-capacity event at the arena. Many of the impact analyses herein are unaffected by the time of events. However, there are some, particularly the transportation analysis, where the impacts are closely associated with the two event scenarios analyzed. More discussion as to why these two scenarios have been selected for analysis is included in the Transportation section, pp. 9-10, following.

LAND USE, BUSINESS ACTIVITY, AND EMPLOYMENT

A direct effect of the construction of the arena on the Seventh/Townsend site would be the relocation of the S/LI/RD uses at that corner in Mission Bay Alternative A to other S/LI/RD sites in the Mission Bay Area. There would be enough undeveloped land at those alternate locations to permit such displacement without resulting in higher buildings there. That is, the relocation could be accommodated by an expansion of building footprints in the alternate S/LI/RD areas.

Construction of the stadium on the Third/Second/King/waterfront blocks would also have the direct impact of displacing existing commercial/industrial uses, in one- and two-story

buildings. Those uses lie outside the Mission Bay Project Area. The uses in the block between Berry Street and the waterfront along China Basin (Pier 46B) are maritime-related; several active tugboats operate there. The uses in the block between King and Berry Streets constitute a mix of industrial activities, some of which may be maritime-related. The displacement of maritime-related activities is particularly notable because relocation opportunities, requiring close or direct access to the waterfront, would be limited in San Francisco.

Less-direct effects of the arena and the stadium would result from the creation of a new type of land use in the Mission Bay / South of Market / South Beach Redevelopment areas. That use would introduce large numbers of people over concentrated time periods, either on weekday afternoons or evenings, or on weekend afternoons or evenings. The main impacts would be on nearby residential areas, existing and proposed.

Residential developments in the South Beach Redevelopment Area are close to the proposed stadium site, as is the South Beach marina (see Figure 3, p. 22, for locations of South Beach blocks). The closest South Beach residential structure is the four- to fourteen-story complex in the block bounded by Colin P. Kelly, Jr. Street, First Street, Brannan Street, and Townsend Street, about one block north of the stadium site. In addition, there is the four-story Delancey Street residential project, on the Brannan/First/Embarcadero triangle. In the Mission Bay Project Area in Alternative A, there would be residential areas along Fourth Street north of Mission Rock Street. They would be separated from the stadium by China Basin Channel, the China Basin Office Building, the Lefty O'Doul Bridge, and the proposed hotel along Third Street. There would also be Mission Bay residential development immediately north of the channel west of Fourth Street, which would be separated from the stadium by the China Basin Office Building. The proposed Mission Bay open space on the east side of Third Street would be directly across China Basin Channel from the stadium.

Near the arena site, but east of the elevated I-280 freeway and south of China Basin Channel, are the existing (houseboat) and proposed residential areas within the western boundary of the Mission Bay Project Area. There would be additional Mission Bay residential development immediately north of the channel (east of Sixth Street), separated from the arena by the elevated I-280 freeway.

In Alternative B, proposed residential uses extending from Third to Sixth Streets between Townsend and Berry Streets would be immediately across Third Street from the stadium, and would be separated from the arena by the elevated I-280 freeway. There would be more open space straddling Third Street immediately south of the channel, near the stadium. Alternative N industrial and commercial uses would be compatible with the stadium and the arena.

Events at the stadium and the arena would introduce more intense activity into neighborhoods, particularly noticeable in the evening. The increased congestion and noise, from the stadium/arena sites themselves, and from added vehicles and pedestrians, would create an impact on present and future residents. Open space in Mission Bay could become an attractive area for pre-game recreation by ballgame patrons, especially on weekends, less so for weekday afternoon and weeknight games. At this time, it is not known exactly how many events would be scheduled for the two facilities. It is probable that the stadium would support at least 80 home baseball games, and the arena at least 40 home basketball games. In addition, other activities such as concerts or conventions may be scheduled at either facility.

The arena would introduce additional year-round employees to the area. In a cumulative sense, the addition would be statistically insignificant when compared to the potential total Mission Bay area employment. Stadium employment would represent a shift from current Candlestick summertime employment (it is presumed that Candlestick Stadium would remain as a football stadium, so that it would not be redeveloped to a new employment-generating use). Therefore, the introduction of the stadium would not be expected to add to citywide or regional employment.

The presence of stadium/arena events could have some growth-inducing impacts. Stadium/arena activities could generate additional demand for commercial goods and services that cater to event attendees. At this time when no detailed event programming has been established for the stadium or arena, it is not possible to indicate the extent of this possible impact. Demand for such commercial activities possibly could be accommodated in building space in the Mission Bay Project Area.

Development of the stadium, along China Basin and the Bay, would add to the displacement of maritime-related operations caused by the Mission Bay development in Alternative A. Mitigation measures could include relocation assistance for displaced business operations, particularly maritime-related activities. Development of the stadium on its waterfront site could require approvals, including amendments of existing Plans, by BCDC and the Port Commission.

Mitigation for the other land-use incompatibility impacts is described in the specific impact categories following.

TRANSPORTATION

BACKGROUND

Transportation impacts analyses for the stadium/arena use Mission Bay Draft EIR's Alternative A in year 2000 as a primary data base. The Alternative A analyses provide the most reliable context for future conditions without a stadium/arena, and thus a base against which the additional effects of the stadium/arena facilities are analyzed. For a full presentation of transportation impacts of Alternative A (as well as the two other EIR alternatives), see Chapter VI. Section E, Transportation in Volume Two of the Mission Bay Draft EIR.

In some cases, impacts of the stadium/arena would not be fully exhibited until all development in Mission Bay is completed (around year 2020). Where applicable and appropriate, those effects also have been evaluated in this supplemental analysis.

The projection of stadium/arena impacts assumes the same transportation network is in place as evaluated in the analyses for the Mission Bay EIR alternatives summarized here. It is assumed that the CalTrain station would be relocated to an interim station around Seventh and Channel Streets. Construction of roadway and transit improvements as part of the I-280 Transfer Concept Program would be completed: extension of MUNI Metro south of Market Street along King Street to meet the CalTrain station; roadway widening and improvements on The Embarcadero and King Street; and replacement of the existing off-ramp from I-280 at Third and Berry Streets with two ramps (one on, one off) accessing I-280 from King Street near Sixth Street.

In addition to the introduction of MUNI Metro service to the area, there would be extensions of MUNI surface street routes to or through Mission Bay that would also accommodate visitors to stadium/arena events. These lines, such as the 30-STOCKTON and 15-THIRD, also would provide connections to Market Street and other parts of the central downtown area. Furthermore, it is assumed MUNI would provide Ballpark Express shuttle bus service similar to that currently provided to Candlestick Park.

Some off-street parking would be provided at each of the two facilities. About 3000 spaces would be adjacent to the stadium and about 2000 next to the arena, in multi-floor parking structures.

TRAVEL CHARACTERISTICS

Travel characteristics of visitors to the stadium/arena are based primarily on survey data collected at two separate times at Candlestick Park, and theoretical analyses presented in the 1983 Stadium Feasibility Analysis report published by the City. These sources provided base trip distribution, modal split and vehicle occupancy factors; they were then modified slightly for use in this analysis to account for the downtown location of the proposed stadium/arena facilities. Tables 1 and 2 present the numerical factors used in this analysis.

TABLE 1: TRIP DISTRIBUTION FACTORS FOR THE STADIUM/ARENA ANALYSES

	Candlestick Park		Downtown Location	
Area	1981 Survey/a/	1988 Survey/b/	Projected in 1983 Report/c/	Used in This Study/d/
San Francisco (Includes So. Cal./Out of State)	33.8%	34.0%	38.0%	38.0%
South Bay (Includes Monterey/Santa Cruz)	43.0%	36.0%	36.0%	36.0%
East Bay (Includes Sacramento/Stockton)	11.6%	20.0%	13.0%	16.0%
North Bay	11.6%	10.0%	13.0%	10.0%

/a/ City and County of San Francisco, Department of Public Works, Traffic Division, Report on Candlestick Park Access, 1981.
/b/ Parallax Marketing Research, Inc., Giants Magazine Study, 1988.
/c/ City and County of San Francisco, Stadium Feasibility Analysis, Vol. I, Research and Data, 1983.
/d/ Robert L. Harrison.

SOURCES: Robert L. Harrison and Department of City Planning

On the basis of greatly improved access to public transit and fewer parking resources, the stadium/arena would likely generate a higher use of transit than occurs at Candlestick Park during weekdays. However, during nighttime events at the proposed stadium/arena, there would be adequate parking that would preclude the need for a very high use of transit at that time. While current City policy is to develop programs which promote transit use wherever possible, the assumptions used in this analysis are based on only moderate use of transit to

TABLE 2: MODAL SPLIT FACTORS FOR THE STADIUM/ARENA ANALYSES

Scenario	Mode	Candlestick Park 1981 Survey	Candlestick Park 1988 Survey	Downtown Location Factors Used in This Study
Weekday 3:00-4:00 p.m. (Scenario One, Stadium Sellout)	Auto	81.0%	85.0%	59.0% /a,b/
	Public Transit	14.0%	5.0%	26.0%
	Other/c/	5.0%	10.0%	15.0%
Weeknight 6:30-7:30 p.m. (Scenario Two, Baseball Sellout and 50% Arena Use)	Auto	87.0%	89.0%	80.0% /a,b/
	Public Transit	9.0%	NA	13.0%
	Other/c/	4.0%	11.0%	7.0%

NA - not available.

/a/ An average vehicle occupancy of 2.75 persons per vehicle is used in the analysis. This is the lowest occupancy rate observed in earlier surveys.
/b/ The main determinant of the auto mode share is the supply of available parking. With substantially more limited parking resources available on weekday afternoons, levels of auto use would be lower than levels of auto use during weeknights.
/c/ Other modes include charter bus, walking, and taxi.

SOURCE: Department of City Planning

those games when parking is available. This approach is used in order to ensure that the impacts of auto use are not understated. In this analysis, auto use is is assumed to be 80% of total person trips to night events. For stadium sellout weekday events, when parking is limited, auto use would have to be reduced to about 59% of total trips in order for parking supply to accommodate parking demand.

EVENT TIMES

As previously stated, this analysis is based on two event scenarios at the stadium/arena. They were selected for purposes of evaluating their implications for peak period travel conditions which occur during the weekday afternoon commute. While it is recognized that events at the stadium/arena also would generate transportation impacts on weeknights and weekends, the intent of the analysis is to examine those travel impacts when background conditions are typically most adverse.

Scenario One assumes a sellout baseball game (45,000 attending) at the stadium during a weekday afternoon. With an assumed game time of 12:00 noon, the game would end about 3:00 p.m., with the majority of departing fans entering the transportation system between 3:00 and 4:00 p.m. Scenario Two assumes a nighttime sellout crowd (45,000) at the stadium and a 50% capacity event (10,000 attending) at the arena. Those events are assumed to begin at 7:30 p.m., with most patrons arriving between 6:30 and 7:30.

The attendance figures represented in these event scenarios are conservatively high for the purposes of conducting a reasonably high-end impact analysis. Past records for Candlestick Park indicate that sellout crowds are not typical in San Francisco. During the 1988 season, which yielded one of the highest attendance records for Candlestick, the single sellout game of 54,500 occurred on opening day; beyond that, there were only three other games of the 79 home games that exceeded an attendance of 45,000. Average attendance at all weekday or weeknight games last season was between 18,000 and 19,000.

In light of those statistics, the attendance figures assumed in this analysis incorporate a substantial overestimate of impacts. To the extent other combinations of activities could be scheduled between the stadium and arena facilities that have overlapping effects with the afternoon commute, it is likely the impacts analysis presented here would account for them, though in indirect terms. Thus, for example, it is quite possible the arena with its 20,000 seats would hold sellout events. However, it is not likely to occur concurrently with a stadium sellout. Given that the analyses evaluate event scenarios with an attendance range of 45,000 to 55,000, either would cover the effects of an arena sellout.

It is important to note that this anlaysis of future cumulative impacts was not adjusted to account for the fact there would be fewer trips emanating from Candlestick Park. To a large extent, travel associated with the proposed downtown stadium would be the same trips that would otherwise occur at the Candlestick location, trips that also would contribute to cumulative travel demand. Consequently, the projected cumulative conditions presented below incorporate another conservative measure that results in an analysis that would tend to overestimate impacts.

The analysis presented below is not intended to imply that impacts from the stadium/arena would coincide exactly with 4:00 to 6:00 p.m. peak period commute conditions analyzed in the Draft EIR. However, as discussed in the Draft EIR, by year 2000, increased traffic will have expanded the duration of congestion on weekday afternoons. For this reason, the analysis addresses a slightly broader period of time, from about 3:00 to 7:00 p.m., to analyze additional stadium/arena effects relative to the analyses in the Draft EIR.

TRIP GENERATION

Based on the travel characteristic assumptions stated above, the number of stadium/arena trips affecting the afternoon commute is presented in Table 3 for each scenario. That trip generation table identifies trips by vehicle, transit and "other" modes of transportation (e.g., walking, charter bus), distributed to each major geographic corridor.

TABLE 3: VEHICLE, TRANSIT, AND OTHER TRIP GENERATION, 2000

Scenario	Mode	San Francisco	South Bay	East Bay	North Bay
Weekday 3:00-4:00 p.m. (Scenario One, Stadium Sellout)/b/	Vehicle	1,740	4,290	1,860	1,220
	Public Transit	7,660	1,810	940	340
	Other/a/	3,510	1,510	670	500
Weeknight 6:30-7:30 p.m. (Scenario Two, Stadium Sellout and 50% Arena Use)/c/	Vehicle	4,670	6,060	2,660	1,700
	Public Transit	4,940	1,120	580	210
	Other/a/	1,980	940	420	310

/a/ Trips made by walking, taxi, charter buses, and modes other than vehicle or public transit.
/b/ These trips, resulting from visitors exiting the stadium between 3:00 and 4:00 p.m., would be outbound trips.
/c/ These trips, resulting from visitors arriving between 6:30 and 7:30 p.m. for evening events, would be inbound trips.

SOURCE: Robert L. Harrison

YEAR 2000 IMPACTS

Impacts at Cumulative Screenlines/a/

To the extent stadium/arena activities would worsen impacts at cumulative screenlines beyond levels already evaluated in the Mission Bay Draft EIR, the trips would have to be leaving San Francisco. For inbound travel flowing opposite to the peak travel direction, adequate transportation capacity generally is available to accommodate travel demand. As a result, inbound trips to downtown San Francisco do not contribute a major problem during the afternoon peak travel period.

This point is important to understand because the trips generated by attendees in Scenario One would be outbound trips that would contribute to more congested conditions on the highways. On the other hand, inbound trips by attendees arriving for evening events, as assumed in Scenario Two, generally would not worsen cumulative impacts on the regional transportation network. Those nighttime trips, however, would generate traffic and parking impacts in areas surrounding the stadium/arena sites that are additional to those evaluated in the Mission Bay Draft EIR. Those impacts are described below under "Local Intersection Impacts" and "Parking Impacts."

Regional Highway Impacts

Table 4 provides a comparison of how cumulative travel demand at the regional screenlines would be further affected by either of the two stadium/arena scenarios in year 2000. For the East Bay and North Bay in particular, the additional number of vehicles generated under Scenario One would contribute to already congested conditions projected in that year. Travel demand from the stadium would occur when there is virtually no available capacity on the Golden Gate and Bay Bridges. Although the additional trips generated by the stadium sellout would load onto freeways between 3:00 and 4:00 p.m., before the the 4:00 to 6:00 peak period, they would further contribute to expanded congestion periods already projected in the Draft EIR for the Golden Gate and Bay Bridges. That is, the total period of time these bridges would carry full capacity would be longer. For the Golden Gate Bridge, congestion could be increased to a total of about three hours; for the Bay Bridge, the congestion period could extend for a total of about five hours.

As indicated in Table 4, stadium/arena activities also would affect U.S. 101 and I-280 serving the South Bay (Peninsula). The Mission Bay Draft EIR analyses for year 2000 project congestion levels at the cumulative screenline for U.S.101 that would probably extend beyond the 4:00-6:00 p.m. peak period into a third hour, without additional stadium/arena traffic. I-280, on the other hand, is projected to still have available peak period capacity in year 2000 (without new stadium/arena traffic).

At this time, it is not possible to project accurately how many trips to the South Bay, following an afternoon baseball game, would travel via U.S.101 vs. I-280. Congestion levels on U.S. 101 could last for three to over four hours, depending on how many stadium trips were added to peak afternoon commute travel. Congestion on I-280 could extend beyond the peak two hour (4:00-6:00 p.m.) congestion period. If new stadium/arena trips were split evenly between the two freeways, congestion on U.S. 101 could extend for a total of about 3.5 to four hours, while I-280 would be approaching a total two-hour congestion period. As noted earlier, these

TABLE 4: TRIPS AT REGIONAL HIGHWAY SCREENLINES BETWEEN 3:00 AND 7:00 P.M., 2000

Screenline/Facility	Capacity at 3:00-7:00 p.m.	Without Stadium/Arena Demand	Without Stadium/Arena Approx. No. of Hours of Congestion	With Stadium/Arena/a/ Demand	With Stadium/Arena/a/ Approx. No. of Hours of Congestion
North Bay/ Golden Gate Bridge	28,800	27,200	2	28,420	3+
East Bay/San Francisco-Oakland Bay Bridge	38,800	42,850	4.5	44,710	5±
South Bay/U.S. 101 (at County Line)	32,000	30,875	3	30,875 to 35,165	3-4+
South Bay/I-280 (at County Line)	32,000	22,425	less than 1	22,425 to 26,715	2+

/a/ For weekday afternoon sellout event at the stadium.

conditions do not take into accounting offsetting impacts of trips being generated at the downtown stadium location versus those that otherwise would be generated by a sellout game at Candlestick Park.

In light of the ease of access to I-280 by stadium/arena visitors (via on-ramps at Sixth and King Streets and at Mariposa Street), and higher congestion levels projected for U.S. 101, the quickest route to leave the stadium/arena is likely to be via I-280. Travel flow on both freeways would continue to be constricted at their interchange near Alemany Boulevard, north of both of the freeway screenlines. This could result in some drivers diverting trips onto local streets and returning to the freeway south of the interchange to circumvent those congested conditions.

Public Transit Impacts

Projections of public transit use are predicated on the provision of new or increased service to the stadium/arena by MUNI, Golden Gate Transit, SamTrans and CalTrain. Table 5 shows the number of new trips projected for each regional transit carrier associated with the two stadium/arena scenarios analyzed.

TABLE 5: TRANSIT PATRONAGE AND EQUIPMENT REQUIREMENTS, STADIUM AND ARENA, 2000

Scenario	Patronage and Equipment	Transit System: MUNI Railway	CalTrain	BART	SamTrans	AC Transit	Golden Gate Transit
Weekday 3:00-4:00 p.m. (Scenario One, Stadium Sellout)	Patronage	7,660	900	470	910	470	340
	Buses	68	-	-	20	10	7
	Railcars	29	13	7	-	-	-
Weeknight 6:30-7:30 p.m. (Scenario Two, Stadium Sellout and 50% Arena Use)	Patronage	4,940	560	290	560	290	210
	Buses	44	-	-	12	6	5
	Railcars	19	8	4	-	-	-

SOURCE: Robert L. Harrison

The greatest transit system impacts would occur under Scenario One, when fans depart the soldout ballgame. As noted above, all weekday ballgames would begin at noon and end at about 3:00 p.m. This means that transit system operators would have to have their equipment available from 3:00 to 4:00 p.m. in order to serve the stadium crowd. Following the ballpark service, most operators would need to commit their entire transit fleet to the normal afternoon peak commute period. If ballgames ended much after 3:00 p.m., public transit systems would have a difficult task in servicing both the stadium and normal commute travel demand. This service planning issue would not be unique to the proposed stadium; it would be applicable for wherever a stadium is located in San Francisco.

MUNI would experience the greatest impact of the transit systems that serve the stadium/arena. MUNI would need to operate "Ballpark Specials" on several surface routes, similar to the type of service currently provided to Candlestick Park. This bus service would be in addition to other permanent planned MUNI surface routes and the extension of MUNI Metro light rail service into Mission Bay. Among these various types of services, Scenario One would require the equivalent amount of personnel and service provided by about 68 buses and 29 Metro railcars.

Service needs are expressed in terms of equivalent transit vehicles, because it cannot be determined at this time how MUNI or other transit providers would choose to deploy pre-peak-period service in 2000. It is possible some demand could be accommodated on regularly scheduled service at that time, in which case the equipment requirement estimates in Table 5 would be overestimates of need.

The transportation analyses in the Mission Bay DEIR forecast full utilization of the peak-period (4:00-6:00 p.m.) Golden Gate Transit, BART-East Bay and AC Transit service available in year 2000 to carry commuters from the Downtown & Vicinity. With the additional number of trips generated under Scenario One, Table 5 provides the estimated additional transit vehicles needed by each carrier to provide the increased passenger capacity for new trips generated under Scenario One.

Table 5 also estimates the additional number of vehicles needed to meet stadium/arena demand on South Bay Peninsula transit service providers. Unlike its forecasts for future transit service to the East Bay and North Bay, the Mission Bay EIR forecasts unused capacity on Caltrain, SamTrans and South Bay BART during the peak period. In light of that, there may be more ability for these agencies to accommodate pre-peak stadium/arena trips than is indicated by the estimated equipment requirements.

Substantially less public transit service would be needed to transport visitors to the nighttime events assumed in Scenario Two. As discussed above, fewer people are assumed to take transit to the stadium/arena at night, when more parking is available. In addition, arrivals to the stadium/arena facilities would be inbound trips, for which there would generally be greater transit capacity than for outbound trips. It is therefore less likely that the transit vehicle requirements shown in Table 5 would represent a need for that amount of net new service; it is possible much of this demand could be accommodated by regularly scheduled service.

Impacts on the Local Transportation System

Parking impacts are determined by the number of vehicle trips generated by the two stadium/arena scenarios analyzed, as presented in Table 3. By the same token, the available supply of parking would affect the number of vehicle trips that would occur. Thus, as previously discussed, the area around the stadium/arena would accommodate fewer cars during a weekday than during a weeknight or weekend, because most of the parking supply would be occupied by downtown workers. The traffic analysis for local intersections below accounts for the different supply of available parking between the two scenarios evaluated.

Local Intersection Impacts

Vehicle trips to and from each part of the Bay Area have been assigned to the most logical city street and freeway routes leading to the parking areas for the stadium/arena. Each trip path has been traced through the street network, so that traffic movements at each intersection studied can be determined and recorded. At each intersection, the trips associated with the stadium/arena, combined with all other traffic projected to occur in 2000, are the basis for the Level of Service calculations presented in Table 6.

TABLE 6: INTERSECTION LEVELS OF SERVICE (LOS) AND VOLUME-TO-CAPACITY (V/C) RATIOS, STADIUM AND ARENA, 2000

	4:30 to 5:30 p.m. Future Conditions Without Stadium/Arena		3:00 to 4:00 p.m. Scenario One - Weekday Stadium Sellout		6:30 to 7:30 p.m. Scenario Two - Weeknight Stadium Sellout and 50% Arena Use	
Intersection	LOS	V/C	LOS	V/C	LOS	V/C
Third/King	D	0.89	E	0.92	F	1.49
Third/Townsend	A	0.57	E	0.98	E	0.94
Third/Mariposa	C	0.78	C	0.79	F	1.02
Seventh/Townsend	B	0.67	F	1.07	F	1.36
Fifth/King	C	0.77	F	1.08	F	1.18
Sixth/Brannan	E	0.92	F	1.09	F	1.04
Second/Harrison	E	0.98	E	0.98	F	1.04
Fourth/Harrison	E	0.92	C	0.78	D	0.88
Third/Fourth	C	0.74	C	0.71	C/D	0.80
Seventh/Sixteenth	A	0.52	B	0.62	D	0.89
Division/Potrero	C	0.75/a/	B	0.69	B	0.65
The Embarcadero/Townsend	B	0.60/a/	B	0.69	F	1.02

/a/ 4:00-5:00 p.m. These intersections were not evaluated in the Mission Bay EIR.

SOURCES: Mission Bay EIR and Robert L. Harrison

As stated earlier, impacts from the two stadium/arena scenarios would not coincide exactly with peak commute conditions from 4:00 to 6:00 p.m. By 4:00 p.m., most fans would have departed the stadium under Scenario One; for Scenario Two, few people would arrive in the area by 6:00 p.m. for a 7:30 p.m.event. However, the traffic impacts generated by either of these scenarios would occur close enough to peak-hour traffic conditions that intersection operating levels for an expanded period are presented in this analysis. The projections in Table 6 thus present an indication of areas where stadium/arena events, depending on the time they occur, would extend congested conditions beyond those generated during the peak-hour commute. Figure 2 indicates the locations and operating conditions of the intersections analyzed.

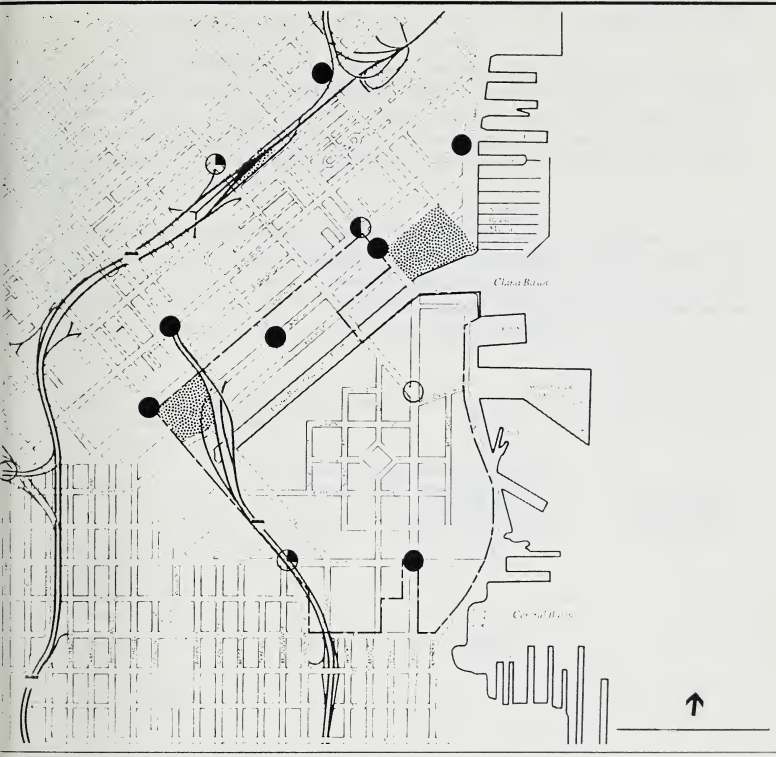
As shown in Table 6, the impact of local traffic generated by major events at the stadium/arena would be substantial for those streets and intersections adjacent to the parking garages and lots which would serve the facilities. As a result, much of King and Townsend Streets, as well as nearby freeway on-ramps, would be further congested during the afternoon commute period. For intersections where volume-to-capacity (v/c) ratios exceed 1.00, congestion would extend beyond one hour if no mitigation measures were incorporated. Mitigation measures are available to improve traffic operations. They are described in the Mitigation section below, pp. 23-27.

Most streets and intersections more distant than about one-half mile from the project sites would not experience substantial impacts from stadium/arena-generated traffic. The nature of the grid system of city streets would allow many options for travel paths, enabling drivers to disperse quickly, or arrive from a number of streets. However, this could result in increased travel on streets in surrounding residential neighborhoods such as South Beach or Potrero Hill. Mitigation measures to reduce or avoid potential traffic or parking impacts are presented on pp. 23-27.

Parking Impacts

Within a one mile (25-minute walking) radius of both the stadium and arena sites, there are about 58,600 on- and off-street parking spaces. That inventory of available spaces does not include on-street spaces in residential areas such as those found in the South of Market, South Beach / Rincon Point, Mission Bay or Potrero Hill.

During the weekday, most of the spaces are occupied, about 85%. During the evenings and weekends, more parking is available; about 70-80% of off-street and 50% of on-street spaces are available at these times.



MISSION BAY BOUNDARY

LEVEL OF SERVICE C OR BETTER

LEVEL OF SERVICE D

LEVEL OF SERVICE E

LEVEL OF SERVICE F

Mission Bay

URCE: Environmental Science Associates, Inc.
and Barton-Aschman Associates, Inc.

FIGURE 2
INTERSECTION OPERATING LEVELS BEFORE OR AFTER EVENTS AT THE STADIUM AND ARENA

In year 2000, the Mission Bay Project Area would still be largely undeveloped. This analysis assumes that undeveloped lots in Mission Bay, north of China Basin Channel, would provide temporary surface parking for stadium/arena events. An estimated 3600 spaces could be made available on the lots. In addition, it is assumed another 1500 spaces would be created in structured parking north of China Basin Channel, built as part of office development expected to be completed by year 2000.

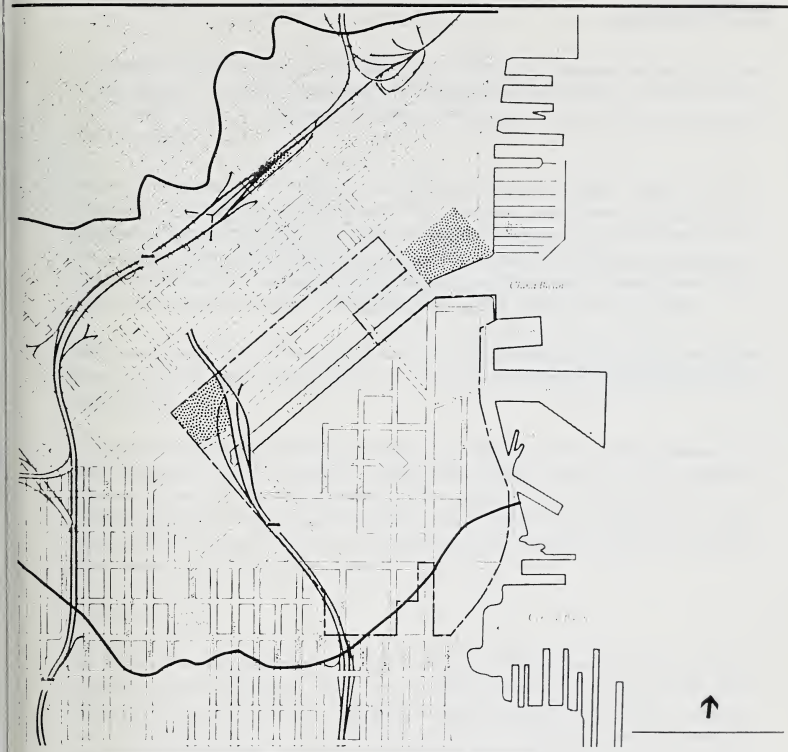
The total number of vehicle trips shown in Table 3 for each scenario determines the parking needed for those who attend stadium/arena events. In addition, the stadium/arena staff would require about 500 parking spaces for major events. Space would also have to be available near the stadium and arena to park charter buses. The total parking requirements are compared to parking availability for each scenario studied, in Table 7.

TABLE 7: TOTAL PARKING REQUIREMENTS AND PARKING AVAILABILITY, STADIUM AND ARENA, 2000

Scenario	No. of Parking Spaces for Private Vehicles (Stadium/Arena Users and Staff)		No. of Required Charter Bus Parking Spaces
	Requirements	Availability (Within 15-Min. Walk)	
Weekday 3:00-4:00 p.m. (Scenario One, Stadium Sellout)	9,600	9,900	75
Weeknight 6:30-7:30 p.m. (Scenario Two, Stadium Sellout and 50% Arena Use)	15,600	18,500	52

SOURCE: Robert Reeves

For Scenario One, a weekday afternoon sellout event at the stadium, visitors could find parking within a 15-minute radius walk (a distance of about three quarters of a mile) from the stadium facilities. This is possible if attendees coming to the stadium travelled at the higher transit mode shares assumed in the analysis: about 40% by transit or other non-automobile mode. Figure 3 provides an approximate indication of a 15-minute walking radius.



MISSION BAY BOUNDARY

15 MINUTE WALKING DISTANCE BOUNDARY

NOTE: This area, about 1/2 – 3/4 mile in distance, would be affected by parking demand generated from events at the stadium and arena. On-street parking in residential areas were not counted in the inventory of parking spaces assumed to be available for the stadium/ arena. The western boundary of the parking radius is generally formed by a line between the intersection of Division and Bryant Streets, and the intersection of Rhode Island and 18th Streets.

Mission Bay

FIGURE 3
15–MINUTE WALKING DISTANCE TO THE STADIUM AND ARENA SITES

SOURCE: Environmental Science Associates, Inc.

For Scenario Two, arena and stadium events in the evening, an adequate amount of on- and off-street parking would be available within a 15-minute walking distance to meet the needs of visitors, even under the assumption that a higher percentage of them would travel to the area by automobile.

The areas most affected by stadium/arena parking demand under either scenario would be the Mission Bay Project Area, the South of Market, and Showplace Square. Parking supply in the South of Market is expected to increase somewhat in the future, as a requirement of new development. Most of those additional spaces would be used by employees and residents of that new development. Parking is expected to be more limited east of Fourth Street. Thus, stadium/arena parking demand would likely be directed to areas west of Fourth Street.

Other areas such as Inner Mission and Potrero Hill would be less affected, as they are farther away. In addition, some areas would be less attractive as parking resources because of their hilly locations.

If insufficient parking is provided on the stadium/arena sites, off-site parking demand (and traffic congestion) could be greater, forcing stadium/arena attendees to seek spaces at distances greater than average acceptable walking distances. However, over the long run, limited parking resources are likely to result in shifts to greater use of public transit or other non-automobile modes, or higher vehicle occupancies (i.e., carpools) to avoid the additional inconveniences and increases in travel time.

Pedestrian Impacts

The stadium/arena would generate a significant number of pedestrian trips. Sidewalks along all major roadway segments such as King, Townsend, Second, Third and Seventh Streets would likely be fully utilized, depending on attendance levels at each location. Pedestrian flows would be espcially heavy at transit stops and stations. CalTrain service from a station at Seventh and Channel Streets would provide almost direct access to the arena site; however, there would still be a substantial walk required for stadium visitors. Impacts of pedestrian activity on sidewalks associated with transit trips could be reducd by provision of adequate transit staging areas on both the stadium and arena sites.

YEAR 2020 IMPACTS

Although the stadium/arena facilities are targeted for completion by 1995, their full impacts would not be apparent until after Mission Bay is fully developed, because the year 2000

impacts are predicated on the availability of parking in Mission Bay to meet stadium/arena parking demand. The estimated completion date for Mission Bay is 2020. The discussion that follows addresses how the stadium/arena would further contribute to local transportation issues and impacts that remain to be resolved. In addition, a brief description of cumulative travel conditions is presented to provide the proper context for evaluating local transportation impacts.

The Mission Bay EIR presents an extensive analysis of projected conditions on local and regional transportation systems for 2020. It concludes that, without major new additions to our transportation network, travel conditions between 2000 and 2020 would deteriorate to levels that would affect the amount of economic activity sustained by the region.

These conditions would not be attributable to any single component of travel, but to regional travel patterns collectively. Thus, to carry out an analysis in any great level of detail for the stadium/arena in 2020 would be an unwarranted academic exercise.

If travel characteristics were assumed to remain the same, incremental impacts generated by the stadium/arena events in 2020 would be the same as those identified in 2000. However, when impacts are examined in the context of transportation conditions in 2020, there would be identifiable differences from conditions in year 2000 on the local transportation level. Impacts generated by the stadium/arena would contribute to projected cumulative transportation problems, but in such small amounts that they would not generate any change in the types of regional mitigation measures recommended in the Mission Bay EIR.

Together with the effects of full buildout of Mission Bay, traffic and ridership impacts of the stadium/arena would result in worse levels of service on local streets and intersections, and public transit, than projected for 2000. A critical difference in impacts generated by the stadium/arena would be related to parking. The buildout of Mission Bay would greatly reduce or possibly eliminate an important parking resource for the stadium/arena, particularly for events scheduled during weekday afternoons. A theoretical result would have patrons parking much further from the stadium/arena, perhaps more than twice the distances projected for year 2000.

The above conditions are not likely. Overall congestion would likely make ridesharing and transit travel among stadium/arena patrons a more viable alternative, though the levels cannot be determined. To the extent visitors to stadium/arena events travel by more efficient means than private automobile, traffic and parking impacts would be reduced. The magnitude of such modal shifts between 2000 and 2020, however, will also depend on the region's success in providing major expansions in transit and ridesharing facilities.

MITIGATION MEASURES

Traffic Impacts Mitigation Measures

The impacts of stadium/arena-generated traffic could be mitigated by traffic engineering improvements at the most congested intersections. These improvements would consist of separate left or right turn lanes or the prohibition of turning movements before and/or after events at the stadium/arena. Most would involve prohibition of parking along the affected roadway segments to free up additional roadway capacity to accommodate increased vehicle volumes. Most traffic operation improvements would have low costs and could be easily implemented on a temporary basis.

The improvements listed in Table 8 are examples of the kinds of traffic engineering measures which could be implemented at the intersections projected to be most congested due to traffic generated by the stadium/arena. The improvements in Level of Service at the intersections which would result due to these mitigation measures are shown on Table 9. Mitigation measures are indicated for intersections operating at a Level of Service D or worse. The direction of travel flow mitigated by each of these improvements is indicated. "Inbound" refers to trips arriving before stadium/arena events; outbound trips refer to departing traffic after the events have ended. The only intersection for which there would be no adequate roadway mitigation is The Embarcadero and Townsend Street, which is projected to operate at Level of Service F.

The kinds of traffic operations improvements listed in Table 8 could significantly reduce congestion at the intersections indicated. With the exception of the intersections immediately adjacent to the stadium, the stadium/arena-generated traffic when added to traffic from other developments would not substantially exceed the capacity of the improved intersections. Most intersection Volume to Capacity Ratios would be about 1.0 or less if the mitigation measures were fully implemented. This means that severe congestion would last for no more than about an hour at most intersections, even for sellout events at the stadium.

Intersections where severe congestion would last for more than one hour before and after sellout events even with the suggested traffic operations improvements would be King Street at Third and Fifth Streets. Traffic volumes at these intersections would be 20% to 30% over capacity. Police traffic control would be needed on King Street to provide the most efficient traffic flows possible before and after sellout events.

In addition to traffic engineering measures at the most congested intersections, a separate category of mitigation measures could be employed on streets in residential neighborhoods.

TABLE 8: EXAMPLES OF TRAFFIC OPERATIONS IMPROVEMENTS

Intersection	Improvements
Third/King	• Provide 4 lane northbound approach (2 thru and 2 right) to facilitate outbound trips following stadium/arena events. This would require coordination with design of the stadium facility site, which would have to provide some space to accommodate this roadway width.
	• Provide police traffic control before and after stadium events.
Third/Townsend	• Provide 3 lane westhound (2 thru + right) outbound, and 3 lane eastbound (1 thru + 1 thru/left + 1 left) inbound approaches, to facilitate departures and arrivals. Either would require use of a parking lane in addition to the two permanent travel lanes.
Third/Mariposa	• Provide 3 lane southound (2 thru + 1 right) outbound, and 3 lane eastbound (1 thru + 1 thru/left + 1 left) inbound approaches for departures and arrivals. Both would require use of a parking lane.
Seventh/Townsend	• Provide 4 lane westhound (2 thru + 2 right) outbound, and 3 lane eastbound (2 thru + 1 right) inbound approaches for departures and arrivals. These improvements could require special design treatment in arena building site plans to produce adequate space for the additional roadway width.
	• Prohibit westbound left turns before and after events at the stadium and arena. Left-turning traffic bound for I-280 (via the Mariposa Street ramps) could be redirected to the Sixth and Brannan Street on-ramp.
Fifth/King	• Provide double southbound right turn lanes. This would require use of a parking lane.
	• Prohibit northbound left turn before and after games.
Sixth/Brannan	• Provide 4 lane eastbound (1 thru + 1 left + 2 right) approach for outbound trips. This would require use of a parking lane.
Second/Harrison	• Prohibit westbound left turn before events for inbound trips.

SOURCE: Robert L. Harrison

Streets in neighborhoods such as South Beach, Potrero Hill and Mission Bay could be restricted to local traffic. Through traffic going to or from the stadium/arena could be prohibited on streets in these residential neighborhoods, through the use of street barriers and/or police control services. This would restrict the impacts of stadium/arena traffic to those main streets and thoroughfares where traffic engineering solutions could be sought to mitigate impacts.

TABLE 9: MITIGATED PROJECT IMPACTS, INTERSECTION LEVELS OF SERVICE (LOS) AND VOLUME-TO-CAPACITY RATIOS (V/C), 2000

Scenario	Local Street Intersections								Street Intersections at Freeway Ramps					
	Third/King		Third/Townsend		Third/Mariposa		Seventh/Townsend		Fifth/King		Sixth/Brannan		Second/Harrison	
	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
Weekday 3:00 - 4:00 p.m.														
Without Stadium/Arena	C	0.71	A	0.41	NA	NA	A	0.50	B	0.61	C	0.77	C	0.76
With Stadium Sellout and No Arena Use	E	0.92	E	0.98	NA	NA	F	1.07	F	1.08	F	1.09	E	0.98
Mitigated Impacts	D	0.88	B	0.67	NA	NA	C/D	0.80	E/F	1.00	E	0.93	D/E	0.90
Weeknight 6:30 - 7:30 p.m.														
Without Stadium/Arena	A	0.56	A	/a/	A	/a/	A	/a/	A	0.50	B	0.61	B	0.60
With Stadium Sellout and 50% Arena Use	F	1.49	E	0.94	F	1.02	F	1.36	F	1.18	F	1.04	F	1.04
Mitigated Impacts	F	1.16	C	0.74	B/C	0.70	D	0.87	E	0.93	F	1.02	D	0.84

NA - Not applicable.

/a/ V/C is less than 0.50

SOURCE: Robert L. Harrison

The City should continue to encourage greater use of access modes other than the automobile and thereby directly reduce the amount of traffic which would be generated by the stadium/arena.

Parking Mitigation Measures

Parking demand generated by the stadium/arena would in many cases exceed the parking supply proposed on the two sites. The measures below identify how off-site parking resources could be made available for use by stadium/arena visitors.

The stadium/arena project would require space for charter bus parking in addition to parking for private cars. This space could be provided on the unused Port of San Francisco lands near Piers 48 and 50 for stadium buses and on the City-owned Channel Street right-of-way near the arena site.

Several kinds of parking programs could be developed as part of the stadium/arena project. The Mission Bay project will be constructing parking garages near the stadium/arena sites. Joint use of these Mission Bay garages could be planned as part of the stadium/arena project. Agreements with other private parking facilities to tie specific parking spaces to particular seats at the stadium and at the arena could be developed as part of the parking program for the stadium/arena project. Such a program has been used successfully in Vancouver, B.C., where users of the downtown stadium receive a specific privately operated parking place identified by location and price when they purchase a ticket to an event at the stadium.

Other innovative concepts such as a "parking boat" could also be explored. Oceangoing auto carriers have been used successfully as auxiliary parking facilities in Japan. Such a parking boat might be permanently docked near the stadium or could be brought in to serve the area during the baseball season and stored or used elsewhere in the off-season. Such an arrangement would be subject to approval by the Bay Conservation and Development Commission.

Residential neighborhoods near the stadium/arena could be protected from the parking demands of the project by neighborhood parking sticker programs. Streets in the South Beach, Potrero Hill and Mission Bay neighborhoods could be restricted to parking for residents and guests only. Parking sticker programs have been successful in other City neighborhoods and could be used to prevent stadium/arena impacts on nearby residential neighborhood streets and parking needs.

In response to growing congestion and parking demand over the long term, the City will need to continue to increase the use of public transit, charter bus, rideshare, walking and bicycling to the stadium/arena to reduce the need for parking.

Public Transit Mitigation Measures

The stadium/arena project should be designed with public transit access requirements as a high priority. Large and efficient loading areas for transit buses, charter buses and taxis should be a mandatory design requirement. Priority routes for public transit vehicles should be identified to allow the efficient movement of these vehicles to and from the stadium and the arena.

The Municipal Railway would have to handle over 7,000 riders in the hour following a sellout event at the stadium. The MUNI Metro extension would have stops at Second and King Streets adjacent to the stadium, and at Sixth and King Streets adjacent to the arena. The Metro is expected to serve about half of the MUNI's total stadium-generated patrons. The stops on the Metro should be designed as high-capacity stations able to handle large peak loads. Pedestrian access to the Metro stations should be physically separated from street level vehicular traffic.

Access routes for surface transit vehicles could be kept clear of competing auto traffic in order to assure efficient loading and departure of public transit vehicles. Streets which could be totally or partially reserved for transit vehicles before and after events include portions of Second Street or Third Street toward the north, Berry Street toward the west, and portions of China Basin Street toward the south.

NOTES - Transportation

/1/ The concept of screenlines is used to describe the magnitude of travel from or to San Francisco's Downtown & Vicinity (which includes the proposed stadium/arena sites), to compare estimated travel volumes by mode of travel to capacities available for each mode. Screenlines are hypothetical lines that would be crossed by persons traveling between the Downtown & Vicinity and other parts of San Francisco and the region. They are therefore the measurement points for the cumulative travel projections presented in this analysis. For more detailed information on the function and location of screenlines, see p. VI.E.31 of the Mission Bay Draft EIR, Volume Two.

AIR QUALITY

Just as the Mission Bay Alternatives, providing more-intensive use of the Project Area than assumed under the 1982 Bay Area Air Quality Plan, are inconsistent with that Plan's land use projections, so too the addition of the stadium and the arena are inconsistent with those

projections, and therefore with the Plan itself. The major air-quality impacts of the stadium/arena would result from increased local and regional vehicular traffic. During the smog season (late summer and fall), the increased emissions would contribute to ozone standards violations east and south of San Francisco. Total countywide emissions of criteria pollutants would be greatest when the stadium/arena vehicular emissions are added to those under Alternative A, as the Mission Bay emissions from Alternatives B and N have been projected to be 60% and 70%, respectively of those from Alternative A. This analysis is conservative in that there has been no adjustment to deduct the vehicle emisisons that have been generated by activities at Candlestick Park, which are already included in the County-wide cumulative base. As the emissions from stadium/arena traffic would be added to the countywide cumulative base, the Mission Bay Alternative emissions per se would become smaller percentages of countywide totals than the numbers presented in Table VI.F.3, p. VI.F.14, of the Mission Bay EIR.

Locally, the cumulative impacts of the stadium/arena would reflect the increased emissions of carbon monoxide (CO) along congested streets and at congested intersections. The Mission Bay EIR states that no violations of state or federal CO standards are expected under any of the Alternatives in 2000 or at build-out. Table 6, p. 16, in the Transportation section of this EIR Supplement shows that for Scenario One (afternoon stadium sellout), between 3:00 and 4:00 p.m., most analyzed intersections would have somewhat worse Levels of Service (higher volume/capacity ratios) than those during the 4:30-5:30 p.m. peak hour (without the stadium) for Alternative A. For Scenario Two (evening stadium sellout, evening arena half-capacity event), between 6:30 and 7:30 p.m., most analyzed intersections also would have worse Levels of Service (higher volume/capacity ratios) than those during the 4:30-5:30 p.m. peak hour (without the stadium/arena) for Alternative A. However, in neither scenario would the increased traffic volumes cause the one-hour CO standard to be violated.

The main effect would be on the eight-hour CO concentrations, because either scenario would extend the duration of congested conditions at local intersections: forward into mid-afternoon in Scenario One, or later into the evening in Scenario Two. The additional traffic volumes could cause violations of the eight-hour CO standard, if the traffic levels produced by Scenario One or Scenario Two were to occur at a time of worst-case meteorology, the basis of the carbon monoxide calculations in the Mission Bay EIR. That worst-case meteorology is essentially a winter-season phenomenon, resulting from the lower wind speeds and the nighttime radiation inversions that occur in the winter season. Therefore, an eight-hour CO violation is most likely to occur if there is a special (non-baseball) sellout event at the stadium during the winter months.

The local baseball season runs from about mid-April to no later than mid-October, before the start of the winter CO season. In Scenario One, vehicular traffic is generated entirely by the maximum 45,000 baseball patrons; in Scenario Two, four-fifths of it is generated by those patrons. Thus, Scenarios One and Two are spring/summer/fall occurrences. As stated earlier in the transportation discussion, these attendance scenarios are conservative given that baseball sellouts would be expected only a few times a year. During the winter season when a sellout event in the (open air) stadium would be even less likely, sellout events at the arena would be the main activity in the area. With a maximum of 20,000 persons attending a 100%-capacity event at the arena, the maximum additional traffic volumes in the winter months would be substantially less (by 50-60%) during the peak CO season than the additional volumes indicated in the stadium/arena columns in Table 6, p. 16 above.

A second reason why violations of the eight-hour CO standard are unlikely is that the main contributor to local CO levels in urban areas is the local background, rather than the additional traffic on specific streets or at specific intersections. Mission Bay EIR Table VI.F.4, p. VI.F.18, shows that the local background contributes about 60-90% of the total CO level at an intersection. Therefore, increases in intersection concentrations of CO are much less than proportional to increases in intersection traffic volumes.

Mitigation measures for air-quality impacts would be those which reduce vehicle trips, described in the Transportation section preceding.

NOISE

The stadium is targeted for completion by 1995. There would be little Mission Bay development by that time. Therefore, the major impacts of stadium construction noise would be felt by existing residential land uses, such as in the South Beach Redevelopment Area. The arena would also presumably be built in the early years of Mission Bay development, so that its construction-noise impacts on proposed Mission Bay residential uses would be minimal.

Existing noise from maritime and other commercial/industrial operations in the land uses to be displaced by the stadium (chiefly from freight loading/unloading, as described on pp. VI.G.6 and VI.G.25, Vol. Two, Mission Bay EIR) would disappear.

The stadium, open to the sky, would be a source of noise to surrounding uses. With a height of at least 100 feet, and possibly up to 150 feet, the top of the structure would be above the top levels of nearby residential buildings in Mission Bay (a maximum of 8 stories, with variants up

to 10 stories). Therefore, there would be no direct (unshielded) path for crowd noise or amplified announcements to reach residents in Mission Bay. However, the top of the stadium structure would be below the upper levels of the 14-story residential complex in South Beach, and intervening buildings are all lower than six-stories. Therefore, residents in those upper levels would be exposed to direct-path crowd or loudspeaker noise.

Without detailed design information on the stadium structure, it is not possible to estimate additional impacts of reflected or structurally attenuated noise, which might be noticeable in other portions of Mission Bay, the South of Market, or possibly Potrero Hill. If the upper levels of the main structure were open below the roofline, more off-site receptors would be exposed to direct-path noise than if the structure were of solid construction up to its roofline. Also, if the stadium were not the same height around its entire perimeter (for example, if the outfield structure to the east of the field were open or lower than the structure at the home-plate end), some crowd or loudspeaker noise could have a direct path toward the east; i.e., toward the Bay and the South Beach Marina, and toward the easterly end of the proposed Mission Bay open space in Alternative A (wetland in Alternative B). Under those circumstances, more levels in the 14-story South Beach residential complex could be exposed to direct-path crowd or loudspeaker noise. In general, crowd and loudspeaker noise from evening ballgames at the stadium would be more noticeable than noise from daytime events, because the background noise levels in the evening would be lower than normal daytime noise levels, and because more residents would be at home in the evening than in the afternoon. Closed windows would attenuate outside noise; however, residents would be exposed to outside noise when they were outdoors, or indoors with windows open. In general, residents closest to the stadium or the arena would experience the highest noise levels from them. Intervening structures, including the China Basin Building, would provide partial shielding for residents and employees in the Mission Bay, South of Market and South Beach areas.

When the stadium is under consideration by city decisionmakers, the sponsor could be required to carry out a noise study, and implement the mitigations suggested by it. Noise shielding (for example, a solid wall up to the roofline) could be imposed as a mitigating condition of project approval.

Because the arena would be a fully enclosed structure, events there would not be expected to produce similar noise impacts on surrounding uses. It should be noted, however, that the Oakland Coliseum arena contains a completely surrounding glass wall at its upper levels; that kind of construction would provide less noise attenuation than conventional wall construction. As with the stadium, the sponsor could be required to carry out a noise study,

and implement the mitigations suggested by it. Noise shielding (for example, a solid construction wall up to the roofline) could be imposed as a mitigating condition of project approval.

The Mission Bay Draft EIR notes that traffic noise impacts differ little among the Mission Bay Alternatives. The stadium/arena local traffic increases shown in Table 6, p. 16, in the Transportation section of this EIR Supplement, would contribute to increases in noise levels along local streets. At and near the p.m. peak hours, those increases would be imperceptible when compared to those predicted for Mission Bay Alternative A; it would take almost a doubling of traffic volumes above those predicted for Alternative A to produce a noticeable change. However, under Scenario Two, the additional traffic after stadium and arena events (after 10:00 p.m.) would increase the local Community Noise Equivalent Level (CNEL) and the day-night (L_{dn}) noise levels, and the additional traffic before those events (after 7:00 p.m.) would increase the local CNEL, thus making the areas north of China Basin Channel and possibly along portions of Third Street more incompatible for housing development than indicated in the Mission Bay Draft EIR, and potentially requiring further noise-reduction construction measures in housing development. [See Volume One, p. II-59, Mission Bay Draft EIR, for explanations of CNEL and L_{dn}, and the expected noise compatibility of housing in Alternatives A and B.]

ARCHITECTURAL RESOURCES AND URBAN DESIGN

The stadium, 100-150 feet in height, would be a massive structure compared to the one-to-two-story maritime and other commercial/industrial structures now on the site. It could be the single tallest structure in the area, visible from many points in Mission Bay, the downtown, and the South of Market area, as well as from more distant neighborhoods such as Potrero Hill. The arena, 100-120 feet in height, would also be more massive than the 30- to 60-foot S/LI/RD structures proposed on that site under Alternative A. The elevated I-280 structure would be between the arena and the office/residential uses to its east and the southeast. However, upper levels of nearby eight-story Mission Bay structures and some warehouses in Showplace Square and South of Market would have a direct line of sight to the upper levels of the arena.

Both the stadium and the arena, having heights of 100 feet or more, could redirect wind flows around them and divert wind downward, substantially increasing wind speed and turbulence at street level, and thereby degrading the environment for nearby pedestrians. Mitigation would include evaluation of wind effects during design of the stadium and the arena, and appropriate design, as necessary to reduce wind impacts to tolerable levels.

During the morning hours, the stadium could shade the east-facing walls of the proposed Mission Bay structures on the west side of Third Street, between Townsend and Berry Streets (office buildings in Alternative A, residential buildings in Alternative B, office and industrial buildings in Alternative N). In the afternoon, shadows from the stadium would be cast eastward toward the Bay. During the afternoon hours, the upper levels of the arena structure could shade the west-facing walls of Mission Bay structures east of Sixth Street, between Townsend and Berry Streets (offices and residences in Alternative A, residences in Alternative B, industrial buildings in Alternative N). Also during the afternoon hours, the upper levels of the arena structure could shade the open space beyond the I-280 freeway structure, on both sides of China Basin Channel. Mitigation of impacts on open space areas could consist of application of design guidelines and criteria, such as those in San Francisco's Sunlight Ordinance.

The major impact in this environmental category would come from the field lighting system that would be an essential element of the stadium operation. Conventionally, the lights are elevated and surround the playing field. At Candlestick Park the lights, roughly at the corners of the stadium structure, are on poles rising immediately outside the structure. The lights are at an elevation about twice the height of the structure itself. Because they must illuminate the entire playing field, stadium lights are extremely powerful and have fairly high beam widths.

Night illumination of outdoor areas can affect sensitive receptors in several ways. The brightness of the light source (i.e., its intensity) can cause glare when the light source is viewed directly; this is the effect people experience if they attempt to look directly at the sun or bright lights. Glare from artificial lighting is more common at night than during the day, because of the extreme contrast between the intensity of the light source and the general intensity of the landscape. Generally, stadium lamps are of high intensity, can have considerable beam widths, and are oriented about 22 to 45 down from the horizontal, so the surfaces of several lamps can be visible at the same time from many off-site areas within the viewshed.

Light sources can also annoy people at night when the light source is not viewed directly. Where intense lighting is viewed against a dark background, the contrast attracts the attention of the viewer and could be considered annoying. Under low-light conditions, the human eye adjusts to the brightest light within view. If the range of light intensity to which the eye is exposed is large, the eye will be relatively and temporarily insensitive to the more dimly lighted portions of the landscape. In addition to being annoying, this can create unsafe night-time conditions for drivers and pedestrians.

That kind of distraction can be illustrated by a few examples. The effect of lights at Candlestick Park on drivers on U.S. 101 is mainly on the peripheral vision. The lights at Bay Meadows Racetrack in San Mateo can be seen from as far away as the Hayward approaches to the San Mateo Bridge, where they are a major element in the direct field of view of motorists westbound on Highway 92. The distracting effect, requiring extra concentration by drivers to see the road ahead, continues for most of the trip across the bridge.

Night lighting increases average illumination levels in spillover areas (areas beyond the playing field and the stadium structure). Increased illumination can affect the suitability of sleeping areas, use of outdoor areas at natural light levels, and privacy. Such impacts need not involve direct glare effects. For some types of activities, such as sleeping, the degree of impact is probably related to the degree of change from the illumination levels to which people have become accustomed. Residential and recreational areas are considered to be the most sensitive receptors for light-producing activities.

If the new stadium lights are at an elevation of about 200 feet, such as is the case as at Candlestick Park, they would be visible throughout much of the Mission Bay area. They could be distracting to motorists northbound on the elevated I-280 structure, and possibly to those on the new King Boulevard off-ramp, depending on the timing and the height of intervening development. However, current lighting design standards for new outdoor sports facilities generally do not involve lighting installations at such great heights, which could reduce the amount of glare spillover.

The lights could also be visible and annoying to residents on the upper levels of Potrero Hill, as the stadium lights would appear brighter than the lights on the Bay Bridge beyond, and the headlights of approaching Bay Bridge traffic. The stadium lights could be visible and annoying to residents of the South of Market and downtown areas, wherever high-rise office buildings do not block the light path.

In addition, skyglow would result occasionally, because of the presence of fog, which occurs frequently in San Francisco during evening hours throughout the year. Skyglow, resulting from reflectance and scattering by the fog, would be visible for several miles, although by its nature it would be less intense and have less direct spillover illumination than the glare under fog-free conditions.

Mitigation could consist of careful design and operation of the stadium lights, with emphasis on minimum required intensities, and maximum direction of the light to the playing field, with minimum spillover beyond the stadium. State-of-the-art lighting fixtures and design are available to achieve this. It would be possible for lights on the stadium to be below 200 feet in

height, using bulbs that would produce a more focussed light than currently provided at Candlestick Park. Reduction of spillover light can be further accomplished by minimizing the angle of light beams to focus lighting on the field, rather than outside the stadium facility. Furthermore, any structural shielding around the lighting sources would mitigate glare impacts.

GEOLOGY AND SEISMICITY

In a major earthquake, groundshaking would be "violent" at both the arena and the stadium sites (EIR, Volume Two, p. VI.K.33). The major impact of stadium/arena operations would be the exposure of a large number of additional people in the area to the effects of a potential earthquake, thus adding to the number of injuries and fatalities, and to the demands on emergency service providers.

In Volume Two of the Mission Bay EIR, Table VI.K.4, p. VI.K.38, provides the following relevant population statistics under Alternative A, at build-out:

Residents	15,000	
Employed		8,700
Unemployed		5,600
Employees	26,000	
2:00 a.m. Population	15,000	
2:00 p.m. Population	31,000	
Evening Population (implied)	15,000	

Scenario One would add 45,000 people to the 2:00 p.m. population, zero to the evening or the 2:00 a.m. population. Thus, on days on which there was an afternoon stadium sellout, the afternoon population in the area (including the stadium site) would more than double.

Scenario Two would add 55,000 people to the evening population, zero to the 2:00 p.m. or the 2:00 a.m. populations. Thus, on evenings with a stadium sellout and a 50%-capacity event at the arena, the evening population in the area (including the stadium site) would more than quadruple.

In no event would the nighttime (2:00 a.m.) population be increased by the stadium/arena project.

Should a major earthquake occur at a time when there were large crowds at the arena and/or the stadium, the Mission Bay EIR's estimates of injuries and deaths would be expected to increase in at least the proportions of the population increases described above. However, the situation would probably be worse. In an earthquake, the presence of large excitable crowds, concentrated in one or two structures, could cause more panic, with resulting pile-ups of people, trampling, etc., than would be expected in conventional buildings.

Mitigation measures could include the range of structural and emergency-response measures provided in the Mission Bay EIR, with special planning for crowd control at the arena and the stadium. The arena could be designed and equipped as a mass-care facility, as in Mitigation Measure K.19, p. VI.K.54, Mission Bay EIR Volume Two.

STAFF-INITIATED TEXT CHANGE

A revision has been made to text in the Draft EIR to correct a statement regarding future congestion on U.S. 101 at the San Mateo County line. on p. VI.E.91 (Volume Two), second sentence of the last paragraph on the page, the text has been revised as follows (additions are underlined, deletions are ~~struck-out~~):

> "The period of full utilization of capacity would increase from about one hour in 1985 to about ~~2.5~~ three hours in 2000."

The typographical error in the DEIR does not change the analysis or conclusions of the text that follows this statement.